

INDRO ROBOTICS SAFETY MANAGEMENT SYSTEM MANUAL

Prepared for

InDro Robotics Inc.
Salt Spring Island

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PREAMBLE

This document has been prepared to support Unmanned Air Vehicle system operations at InDro Robotics Inc., located at Salt Spring Island, British Columbia, Canada. The following major parts are included in this manual:

- a. Safety Policy, Goals and Structure;
- b. Risk Management;
- c. Safety and Quality Assurance;
- d. Safety Training and Education; and
- e. Forms to be used.

This Safety Management System Manual describes how the Safety Management System (SMS) operates within InDro Robotics. This SMS is available to all personnel and encourages active feedback.

The SMS documents all aspects of safety management, including the safety policy, objectives, procedures, reporting and individual safety responsibilities.

MANUAL AMENDMENT PROCEDURES

Manual amendments will be promulgated as required by the SMS Manager. After acceptance and approval by Accountable Executive (as necessary), they will be issued to each manual holder.

It is the responsibility of the manual holder to insert all amendments issued to him/her in a timely manner and ensure all manual pages are consistent with the List of Effective Pages. Manuals issued to each Unmanned Air Vehicle will be amended by the Operations Manager. Each amended page shall record the appropriate amendment number and date.

Any discrepancy between the List of Effective Pages and the actual manual pages will be brought to the attention of the Operations Manager immediately.

MANUAL HOLDERS

Manual Copy	Manual Holder	Address	Telephone
Master	SMS Manager	Philip Reece, Salt Spring	250-931-3933
Copy 1	Chief Pilot	Brad Billwiller, Salt Spring	250-931-3933
Copy 2	Manager	Bob Kobierski, Salt Spring	250-931-3933
Copy 3	Operations Manager	Geoff Mullins, Vancouver	250-812-9032

RECORD OF AMENDMENTS

NOTE

The portion of the text affected by the latest change is indicated by the standard Word designation of tracked changes, including vertical bars at the side of the page, strike throughs, underlined text and text colour changes.

The date of issue of original and amendment list pages are contained in the following table.

Identification of Change		Date Entered	Responsible Person
Amend. No.	Date		
Original Issue	1 August 2018	Not Applicable	Not Applicable
Amendment 1	5 March 2020	5 March 2020	Philip Reece
Amendment 2			
Amendment 3			
Amendment 4			
Amendment 5			

LIST OF EFFECTIVE PAGES

Page No.	Amendment No./ Effective Date	Page No.	Amendment No./ Effective Date
1	AL-1, 5 March 2020	11	AL-1, 5 March 2020
2	AL-1, 5 March 2020	12	AL-1, 5 March 2020
3	AL-1, 5 March 2020	13	AL-1, 5 March 2020
4	AL-1, 5 March 2020	14	AL-1, 5 March 2020
5	AL-1, 5 March 2020	15	AL-1, 5 March 2020
6	AL-1, 5 March 2020	16	AL-1, 5 March 2020
7	AL-1, 5 March 2020	17	AL-1, 5 March 2020
8	AL-1, 5 March 2020		
9	AL-1, 5 March 2020		
10	AL-1, 5 March 2020		

1. SAFETY POLICY, GOALS AND STRUCTURE

1.1 Policy

To prevent accidents and to eliminate damage or injury, InDro Robotics will;

- maintain an active safety management system;
- supports the open sharing of information on all safety issues; and
- encourage all employees and contractors to report safety hazards or concerns.

No disciplinary action will be taken against any employee or contractor for reporting a safety concern.

Safety is an organizational culture with a strong value and InDro Robotics management believe in providing all employees and flight crew with a safe environment.

Our objective is the proactive management of identifiable risks and elimination of injury to personnel and damage to equipment. To that end, we will continuously examine our operation for hazards and find ways to minimize them. We will report incidents, train staff on safety management, document our findings and our responses, and strive for continuous improvement.

1.2 Goals

The SMS goal is the identification and analysis of hazards, occurrences and accidents with the goal of learning from them to ensure best efforts are taken to remove or mitigate reoccurrences.

This manual will be used to educate, promote, and build a guide for management of Safety.

1.3 Structure

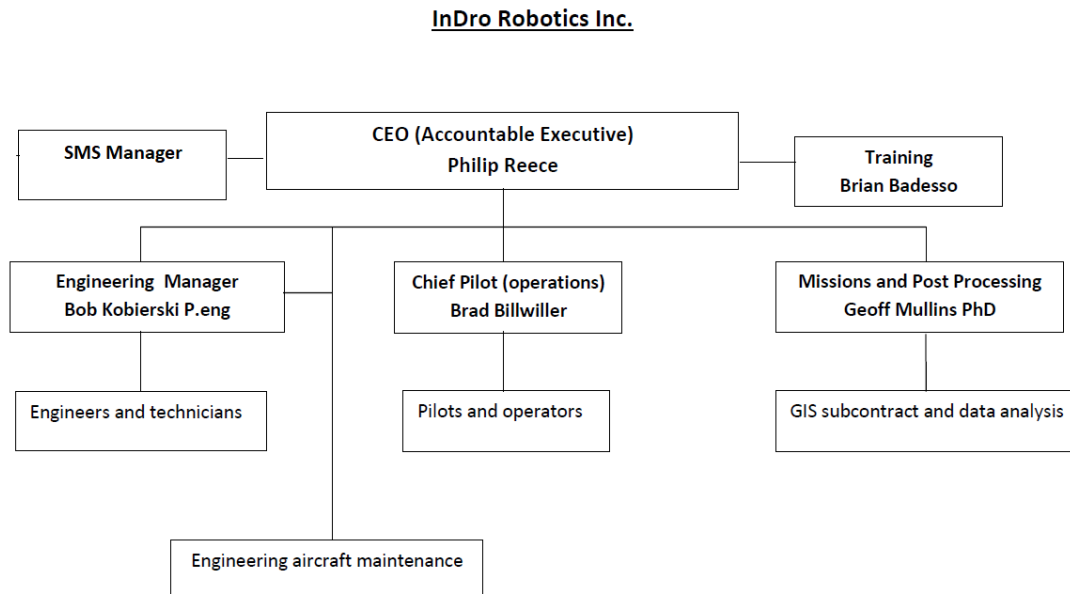


Figure 1 Indro Robotics Inc. Structure

1.4 Roles and Responsibilities

Accountable Executive

- Setting the safety policy and communicating it to companywide;
- Ensuring implementation of SMS; and
- Ensuring personnel, time and finances are allocation to the SMS.

SMS Manager

- Carrying out hazard and safety risk analyses;
- Monitoring all corrective actions and mitigations;
- Working with AE and Training Manager to ensure companywide safety training;
- Working with other UAV/Aviation groups to promote and learn best SMS practices; and
- Communicating with Transport Canada, Nav Canada and other government bodies on safety issues.

Training Manager

- Evaluating companywide safety knowledge;
- Carrying out safety training on a regular basis;
- Promoting the company safety culture; and
- Carry out audits to assess acceptance, use and appropriateness of the SMS.

Chief Pilot

- Setting and assuring safe aircraft operating standards and procedures;
- Establishing and monitoring training for new aircrew members;
- Encouraging flight crew to report hazard and occurrences; and
- Monitor day to day safety of operations and report on findings.

Engineering Manager

- Providing input on SMS for maintenance activities;
- Work with Training manager to train maintenance technicians;
- Implementing the related SMS elements at maintenance department level; and
- Encouraging Engineering personnel to report hazard and occurrences.

Company wide

Strive to decrease the hazard level to “as low as reasonably practicable”.

Employees of InDro Robotics shall:

- Carry out their duties in compliance with standard operating procedures and regulation;
- Comply with procedures in Safety Management Manual; and
- Communicate safety occurrence and or potential risks.

2. RISK MANAGEMENT

2.1 General

Whilst not all risks can be eliminated the SMS ensures effective risk mitigation to “as low as reasonably practicable”.

Risk management consists of:

- identify hazards;
- assess the level of risk;
- consider mitigation procedures that are in place;
- improve or add further risk mitigations;
- share, train and implement; and
- monitor and review.

Hazard identification can be made at any time, and is mandated when an incident or accident happens, a change of operation occurs, and at scheduled review times.

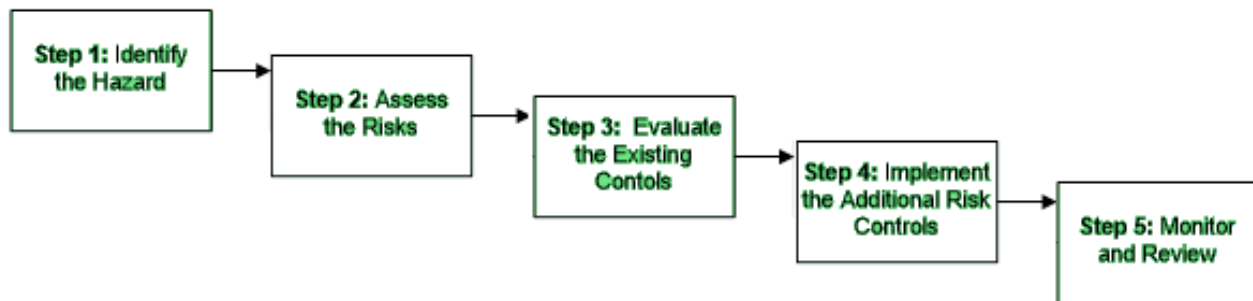


Figure 2 Risk Management Procedure.

2.2 Safety Reporting

InDro Robotics operates a none punitive reporting program all hazards, incidents and other concerns that may compromise safety in any way can be reported and investigated by notifying the Chief Pilot, Training Manager, Safety Manager, Engineering Manager their direct supervisor or by completing the Hazard/Incident Report Form and submitting it as shown.

Safety report shall be entered into the safety reporting database, the contents of a safety report shall not be used in any disciplinary investigation. In addition, any information subsequently obtained by InDro Robotics in relation to the hazard or occurrence through this or any other form of investigation shall not form the basis of disciplinary action against the employee by InDro Robotics.

An ammonized version of the report maybe used for the improving and enhancing safety.

2.3 Non-Punitive Reporting Policy

InDro Robotics foster a just culture of open, non-punitive reporting policies and procedures for all employees and realizes the importance of uninhibited reporting of safety hazards or occurrences.

2.4 Reporting

There is a formal process for hazard identification, risk assessment and control to effectively manage hazards that may exist within the operations of InDro Robotics.

The Hazard/Incident Report Form may be submitted incomplete if all necessary information is not available at the time a hazard is identified or an incident occurs. It can be submitted anonymously if the reporter wishes, this will not allow for a direct response, in all other matters the report will be treated in the same way.

Process for assessment of Risk and follow up

1. hazard identification;
2. identify the consequences of the hazard occurring;
3. evaluate the risk for likelihood and severity;
4. identify risk reduction and mitigation strategies;
5. implement risk reduction measures;
6. monitor effectiveness; and
7. review and update as necessary.

2.5 Matrix to assist in objectively categorizing the risk

Identification of the Severity/Consequence of the Event

Consider any current mitigation measures and assess the severity in terms of the worst possible realistic scenario.

Level	Severity/ Consequence	Descriptor
5	Severe	Catastrophic (at least one fatality, huge financial loss)
4	Major	Major (extensive injuries to one or more people, major financial loss)
3	Moderate	Moderate (medical treatment required, high financial loss)
2	Minor	Minor (first aid treatment at the workplace, medium financial loss)
1	Negligible	Insignificant (no injuries, low financial loss)

Likelihood of occurrence

Consider any current mitigation measures and assess the likelihood/probability of the risk occurring.

Level	Likelihood	Descriptor
5	Almost certain	Imminent—is expected to occur in most circumstances
4	Likely	Once in the next month, will probably occur in most circumstances
3	Possible	Once in the next 12 months, might occur at some time
2	Unlikely	Once in the next 1–5 years, could occur at some time
1	Rare	Once in the next 10 years—may occur only in exceptional circumstances

Severity	Severe	5	5	10	15	20	25
	Major	4	4	8	12	16	20
	Moderate	3	3	6	9	12	15
	Minor	2	2	4	6	8	10
	Negligible	1	1	2	3	4	5
			1	2	3	4	5
			Rare	Un Likely	Possible	Likely	Almost Certain
			Probability				

S	Severe Risk 20-25	Severe risk: Stop operation as currently conducted. Control measures must be implemented to reduce the risk back to moderate or lower.
H	High Risk 15-19	High risk: Control measures must be implemented to reduce risk back to moderate or lower.
M	Moderate Risk 6-14	Moderate risk: Action taken to manage risk and reduce it to as low as possible
L	Low Risk 1-5	Low risk: Make changes to operation if possible

2.6 Corrective Action

The corrective action plan will identify the steps to prevent the hazard from causing harm and to reduce risk to “as low as reasonably practicable”.

Risk control measures can reduce the level of risk by:

- Reducing the severity of potential consequences;
- Reducing the probability of occurrence harmful effects; and
- Reducing the exposure to that risk.

2.7 Putting Risk Controls in place

Resources and funding will be provided to action the risk mitigating plan.

Not all risks can be eliminated. Risks must be managed to a level known, “as low as reasonably practicable”. This means that the risk must be balanced against the time, cost and difficulty of taking measures to reduce or eliminate the risk.

2.8 Investigation and Analysis process

The Safety manager shall start a review within 2 working days following an occurrence report. If warranted an investigation will commence, facts will be collected to gain an understanding of the event and the actions leading up to the event, from this and other related information gathering a findings will be made and shared for review, risk assessment will be made and mitigation steps will put in place. These measures will be shared company wide and training will be provided if necessary. The program will be flagged for on going monitoring to assess suitability of measures.

2.9 Ongoing assessment

Follow on evaluate of the risk mitigation measures implemented to verify they working as intended. These will be included in the regular safety review meetings carried out six times per year.

3. SAFETY AND QUALITY ASSURANCE

Safety Quality Assurance is the ongoing monitoring of the Safety Management System and its effectiveness.

Monitoring and review will be performed through reviews, inspections and audits.

3.1 Safety Audits

Safety audits focus on the validity of the system and the status of safety risk control measures.

Internal Audits

The Safety manager shall have responsibility for the internal Safety Audits but may be assisted by another internal or external auditor.

External Audits

The SMS will seek a third-party audit review and report.

3.2 Audit process

The Safety manager shall perform audits or appoint a designate with the relevant knowledge, background and experience

A report will be provided to the Accountable Executive showing- Scope and Purpose of audit, findings, assessment of findings, Mitigation strategies and their effectiveness.

The summary of the audit will be distributed and presented at the regular safety meetings.

4. SAFETY TRAINING AND EDUCATION

SMS training will be provided to all employees in accordance with their position and duties with regard to SMS. Basic SMS will be included in company indoctrination, this will cover; Basic principles of SMS, Safety policies, procedures and standards, Organization structure, methods of reporting Safety Hazards, understanding of Risk Management.

Job-specific training will follow and cover; performing audits and assessments, Root Cause Analysis, Risk Assessment and Corrective Actions.

All training will be recorded and flagged for recurrent training in the calendar and the training record

4.1 Safety Meetings

Safety meetings will be held regularly and cover; reported issues and status, recent hazards and their ongoing monitoring

Appendix A

Hazard Reporting Form

Hazard No. (Assigned by Coordinator)	Date Submitted:
Location of Hazard:	Name of person(s) submitting:

Hazard Description:

Suggested Action:

Appendix B

Occurrence Report

Incident No. (Assigned by Safety Coordinator)	Date Submitted:
Base:	Name of person(s) submitting:
Date of Incident:	Time of Incident:
Location of Incident:	Name of person(s) involved:
Describe Incident: <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
What injury, if any, was caused? _____ Did you (or anyone else) require medical attendance? _____ What property damage, if any, was caused? _____ _____ Names and address of witnesses _____ _____	

(Signature of Employee)

(Date)

Safety manager to complete

Comments on the cause and nature of the accident: _____ _____ _____	
Action taken to prevent a recurrence: _____ _____ _____	
_____ (Signature of Safety manager)	_____ (Date)

Appendix C

Event Notification

Report Number:				
A. EVENT DETAILS:				
1. Type:				
Incident/ accident	Personal Injury	Equipment damage	Environmental damage	
Near-miss	Complaint	Ongoing condition	Hazard	
2. Category (event title):				
3. Date: / /		4. Time: am/pm		
1. Reported Date: / /		6. Reported Time: am/pm		
7. Reported to:		8. Witness Name/s:		
9.				
10. Description:				
11. Diagram:				
Sketch event, scene, or a picture of the sequence of events, including location of involved people and equipment at the time of the event. Take photographs (attach in order)				
12. Organisation/s:				
B. ENVIRONMENTAL IMPACT:				
C. EQUIPMENT:				
14. Equipment name /type:				

D. PERSONAL DETAILS:					
15. Name:			16. Employer:		
17. Role:					
18. Duty status at time of the event:			19. Employment Status:		
<input type="checkbox"/>	On duty at workplace commenced		<input type="checkbox"/>	Employee	
<input type="checkbox"/>	Travelling while on duty		<input type="checkbox"/>	Contractor	
<input type="checkbox"/>	Travelling to/from work		<input type="checkbox"/>	Other, specify:	
20. Did person cease work before end of shift? YES NO 21. If yes, what time? am/pm					
22. Injury Severity:					
<input type="checkbox"/>	Fatality		<input type="checkbox"/>	Lost Time	
<input type="checkbox"/>	First aid		<input type="checkbox"/>	Disabling Injury	
<input type="checkbox"/>			<input type="checkbox"/>	Medical Treatment	
<input type="checkbox"/>			<input type="checkbox"/>	Occupational Disease/illness	
23. Activity being performed:					
<input type="checkbox"/>	Aerial agricultural operations		<input type="checkbox"/>	Dropping	
<input type="checkbox"/>	Aerial photography		<input type="checkbox"/>	Sling load operations	
<input type="checkbox"/>	Aerial surveying		<input type="checkbox"/>	Feral animal control	
<input type="checkbox"/>			<input type="checkbox"/>	Search and rescue	
<input type="checkbox"/>			<input type="checkbox"/>	Winching/hoisting	
E. IMMEDIATE CORRECTIVE ACTIONS:					
24. Immediate corrective actions:					
25. Signature of person completing event report:					
Name:		Signature:		Date:	Time am/pm
26. Event notification sign-off by the shift supervisor:					
Name:		Signature:		Date:	Time am/pm

Appendix D

Analysis of Contributory Factors

Check applicable boxes (X)

Work Place Factors impact				Human factors impact			
WF1	Lighting		Some Significant	HF1	Complacency/motivation		Some Significant
WF2	Weather Time of day		Some Significant	HF2	Alcohol/other drugs		Some Significant
WF3	Dust/condemnations		Some Significant	HF3	Familiarity with task		Some Significant
WF4	Noise		Some Significant	HF4	Fatigue		Some Significant
WF5	Wildlife		Some Significant	HF5	Time pressure		Some Significant
WF6	Surface gradient/conditions		Some Significant	HF6	Peer pressure		Some Significant
WF7	Work Space access/restrictions		Some Significant	HF7	Physical capabilities		Some Significant
WF8	Housekeeping		Some Significant	HF8	Mental capabilities		Some Significant
WF9	Tools/equipment condition/availability		Some Significant	HF9	Physical stress		Some Significant
WF10	Task planning/preparation		Some Significant	HF10	Mental stress		Some Significant
WF11	Routine/non-routine task		Some Significant	HF11	Confidence level		Some Significant
WF12	Abnormal operational situation/condition		Some Significant	HF12	Secondary goals/external factors		Some Significant
WF13	Risk perception/management		Some Significant	HF13	Personality		Some Significant
WF14	Personnel safety		Some Significant	HF14	Manuals and procedures		Some Significant
WF15	Other workplace factor/s		Some Significant	HF15	Other human factors		Some Significant
Code	Based on the above events facts, IDENTIFY the task/environmental conditions that contributed to the event –give reasons.						